



Coastal adaptation laws and the social justice of policies to address sea level rise: An Indonesian insight

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ABSTRACT

Climate change and sea level rise (SLR) poses serious risks to coastal communities around the world requiring nations to apply adaptation laws and policies. Climate change will exacerbate the existing threats to vulnerable communities, such as the poor, and threaten the food security of populations in coastal areas through the effects of flooding due to coastal inundation. Indonesia is an Archipelagic State of over 17,000 islands and is vulnerable to climate change impacts in its coastal areas and especially in its highly populated low lying delta areas, such as Jakarta and Semarang, where vulnerability to sea level rise is evident. The adequacy of the legal adaptation framework in Indonesia to respond to this climate vulnerability is assessed and it is found to have limited consideration of the community burden arising from these climate and SLR uncertainties. A more inclusive social justice approach could assist government to respond to the impacts from these issues and to their implications for vulnerable groups. The nation can improve adaptive legal measures to address climate change impacts and increase the involvement of local people in climate change adaptation decision making. Funding is required to assist policy makers to further incorporate adaptation into decision making, and this could improve social justice outcomes for vulnerable Indonesian coastal communities.

1. Introduction

Climate change and sea level rise (SLR) has threatened and posed serious risks to coastal communities around the world. This phenomenon is likely to accelerate in the future (Schofield and Freeston, 2013). The Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) suggested that “coastal systems are particularly sensitive to three climate change impacts such as sea level rise, warming of ocean temperatures and increasing ocean acidity” (Wong et al., 2014). The IPCC suggested that “without adaptation a hundred million people will be affected by coastal flooding and will be displaced due to land loss by year 2100” (Wong et al., 2014).

There is uncertainty in determining annual sea level rise estimates and in making projections for the coming decades, but it is argued that modest sea level rise has the potential to have severe consequences for coastal communities (Schofield and Freeston, 2013). On average, it is reported that global sea levels have risen by more than 19 centimeters (7.5 inches) since the 19th century, after 2000 years of relatively little change (Plumer, 2016). One key message from the current IPCC special report on global warming is that “we are already seeing the consequences of a 1 degree centigrade of global warming through more

extreme weather, rising sea levels, and diminishing Arctic Sea ice among other changes” (IPCC, 2018). Sea level rise impacts will not be uniform around the world (IPCC, 2018).

Many archipelagic and island states are now experiencing the impacts of sea level rise. Indonesia is an archipelagic state and is vulnerable to climate change impacts, especially in coastal areas (Fook and Chen, 2010). Climate change impacts, such as coastal flooding, coastal erosion and inundation, submergence of land and water pollution are becoming a serious threat in coastal areas in Indonesia. These impacts have been observed in several coastal cities such as Jakarta and Semarang and Demak. Highly populated and low lying deltas, such as Jakarta and Semarang, are highly vulnerable to sea-level rise. North Jakarta has routinely been affected by coastal flooding with a range of 15 cm–90 cm in water level rises, especially during the rainy season (Nugroho, 2017). Experts predict the increase in sea level rise (SLR) of 25 cm–50 cm by 2050 and 2100 that is projected in models, will inundate many of Indonesia's coastal cities (Ministry of Environment, 2010). Based on modelling, the rate of sea level rise in Indonesia ranges from 0.2 cm/year to 1 cm/year with average of rate 0.6 cm/year (ICCSR, 2010). In addition, land subsidence often more prevalent on the coast, will exacerbate the impact of sea level rise.

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The combination of sea level rise and land subsidence is the main threat to coastal land. Some areas in Semarang and Demak have been permanently inundated and forced large scale displacement of local communities. Flooding and storm surges have disrupted people's daily activities. In addition, post disaster illnesses, such as diarrhoea, typhoid, leptospirosis and respiratory tract infections can spread and affect the community. People are also suffering the loss from the damage to property because of the flooding and the increased costs of rehabilitation which is an unforeseen cost burden. Indeed, flooding will reduce the quality life of the people affected and decreased the property values of land and houses (Hadi, 2017). It is argued that climate change is expected to exacerbate current community vulnerabilities and societal inequalities also (Otto et al., 2017).

This article examines climate change and SLR adaptation strategies in coastal areas. It examines national and local current adaptation policy options to address SLR and examine the gaps in existing approaches. The main issue that will be examined is how government policy options to address SLR can protect vulnerable groups in poor coastal communities which will be affected by SLR. In addition, while local communities bear most of the burden of climate change adaptation cost, they are rarely involved in the decision making. There are contending issues between environmental protection and the social justice implications of climate change adaptation measures. The adaptation regime in coastal areas needs to be established in a legal framework. In Indonesia this needs to include not only disaster risk reduction and resilience components, but also an environmental and social justice components.

The article commences with an introduction to the national adaptation laws in coastal areas in Indonesia and examines a framework for social justice and how it should underpin the building of adaptive capacity. There is then an assessment of the existing legal framework at the national level and how it addresses SLR. The gaps identified by the assessment of national adaptation laws are discussed and there is discussion of how these adaptation gaps not only need to be remedied, but that there also needs to be consideration of climate justice issues. Current examples of scenarios in several of Indonesia's main cities are used to enhance the discussion and consideration of the ways forward for Indonesia.

2. Adaptation laws in coastal areas and climate justice implications

Adaptation has recently become a focus of policy action and concern especially in developing countries with low lying coastal areas (Adger et al., 2006). While literature reviews mostly explore adaptation options, to date little attention has been given to the environment and social justice aspects of adaptation to climate change (Adger et al., 2006). Justice in the climate context has historically been considered as an issue between nation states, however more recently scholarship has looked at sub-national issues concerning social justice (Vanderheiden, 2016). Climate justice links human rights and development to achieve human-centred approaches safeguarding the rights of the most vulnerable (Robinson, 2017). The issue of environment and social justice is frequently becoming the main concern especially in developing countries, where there is often a problem of environmental degradation in coastal areas and widening inequalities between rich and poor (Zain, 2016). Environmental disasters related to climate change, have profoundly affected the human rights and social justice of poor people (Levy and Patz, 2015). Environmental hazards have threatened the rights to the enjoyment of the highest attainable standard of physical and mental health embodied in the Universal Declaration of Human Rights and in the International Covenant on Economic, Social, and Cultural rights (Levy and Patz, 2015).

In the international agenda of climate change, the issue of equity and justice is high in the main debate (Thomas and Twyman, 2005). Even though, equity was the main core principle of the framework

Convention on Climate Change (The UNFCCC), the main debate on fairness was in mitigation, not adaptation (Thomas and Twyman, 2005). In addition, while the issue of social justice has slightly mentioned the UNFCCC, unfortunately it has predominantly focused at a national level, and is often silent on sub-national and local level with regard to the equitable nature of adaptation strategies to climate change (Thomas and Twyman, 2005). The UNFCCC suggested the adaptation should be taken by mainstreaming climate change considerations into social and economic development policies, employing appropriate methods in impact assessment and minimising the adverse effects to the quality of environment (Art 4 (f) (The UNFCCC, 1992)). Furthermore, the UNFCCC suggests that appropriate and integrated plans for coastal management have been suggested as one of the adaptation measures in article 4 of the UNFCCC.

There is no uniform view on what kind of adaptation measures should be chosen in the legislation for adaptation in coastal areas (Nicholas et al., 2007). These approaches include: protection, accommodation and retreat. Protection involves the establishment of hard structures such as infrastructure and soft structures, such as dunes and vegetation. Accommodation involves people continuing to use the land at risk by erecting flood shelters, or elevating buildings on piles, and retreat implies abandoning areas of the coastal zone (Gilbert and Vellinga, 1991). All these options have environmental, economic, and social implications. For example, hard structures are likely to have impact on local marine water circulation and associated ecosystems. Resettlement of impacted populations can create major problems as the resettled people have difficulty in adjusting to their new environment and in finding new employment. Protection and accommodation measures have less impact on society than retreat options which can create a cultural and psychological crisis to the community (Gilbert and Vellinga, 1991). Regardless of the options taken, it is best if the communities are consulted and involved in decision making and fully recognize the implications of the choices (Gilbert and Vellinga, 1991).

Other literature suggests two approaches to climate change adaptation are impact or hazard based approach and the resilience and vulnerability approach (McDonald, 2010). The hazard based approach has dominated climate policy and involves identification and assessment of risks, so as to modify and to lessen the impact of SLR on the government constructing sea wall, or in the development of "green space" (McDonald, 2010). There are also resilience concerns with improving the capacity of local communities to absorb the impacts of climate change. This has been in-line with IPCC findings which suggest that "the framing of adaptation has moved further from a focus on biophysical vulnerability to wider social and economic vulnerabilities and people's ability to respond" (Noble and Huq, 2014). In addition, in developing countries adaptation strategies will not achieve much without addressing other existing vulnerabilities such as poverty, adequate livelihoods, health, education and institutional or governance accountability (OECD, 2003).

In considering environment, social justice and climate change, there are issues of procedural justice for the recognition, participation and distributive justice of beneficial adaptations and adverse effects of climate change. There are different point of view and ideas about justice and particularly whether adaptation is better if benefiting the greatest number of people? Others might suggest the adaptation needs to benefit the most vulnerable people in these communities (Adger et al., 2006). In terms of procedural justice, Adger argues that vulnerable groups are usually at the end of policy responses to climate change (Adger et al., 2006). They are vulnerable and yet they are often ignored when adaptation policy decisions are made (Adger et al., 2006). It is proposed that the most vulnerable ought to be given special consideration in climate change adaptation policy processes.

Social justice is a core issue in adaptation of coastal areas in many countries. As the disaster frequency increases, it is difficult to protect all properties. In choosing adaptation options for flood risk management from SLR for example some individuals will benefit from the chosen

adaptation option, and some communities will lose, which then creates a justice dilemma (Thaler et al., 2017). For example in Anguedoc-Roussillon (France) the government implemented retreat policy to address sea level rise impacts (Rulleau et al., 2017). However, there is uncertainty, and even the skepticism, towards these long-term risks that characterize any climate change adaptation policy. Not surprisingly, the managed retreat approach is hindered by residents' attachment to their assets and the amenities provided by proximity to the sea (Rulleau et al., 2017). The study showed that people's perceptions of justice and solidarity criteria are important to inform decision-making in shoreline management policies (Rulleau et al., 2017).

In addition, scale, governance and timing have been identified in the literature as having a significant influence on social justice in coastal planning (Frost, 2017). In France for example SLR planning and adaptation policies at national level, face challenges including the sharing of the financial burden between exposed and non-exposed communities and a mismatch between the national and the local scale of climate change planning and lack of local government resources (financial) and capacity of human (Frost, 2017). Supporting policies and legislation are an important issue in addressing SLR and upholding social justice. The law may be lagging behind the demands arising from climate change adaptation (Frost, 2017). National adaptation plans and policies for these coastal and climate issues are assessed using Indonesia as an example.

3. An analysis of the existing coastal adaptation legal framework at the national level

Legislation plays a significant role in providing a basis for promoting climate change adaptation, improving social justice and adaptive capacity (Hurlimann et al., 2013). In this section we examine and identify adaptation options in addressing sea level rise and assess the extent to which it has been adopted by the national legal and policy framework in Indonesia and the challenges in implementation. Indonesia does not have specific laws addressing climate change, impacts and adaptation. Instead, the issues are regulated under several sectoral legislations, decrees and sub-legislations which are in a hierarchy which is lower than formal law.

The analysis covers several different legislative instruments regulating coastal areas which include spatial planning law, environmental management and disaster management law that contribute to climate change adaptation. Even though some legislation might not explicitly mention climate change, we consider they could still be committed to reducing the vulnerability associated with climate impacts through their past application.

The following are the results of where we find policies to address SLR in various legislative sectors.

3.1. Law of the Republic of Indonesia, No. 24/2007: disaster management

Law No 24/2007 is the legal basis for disaster management in Indonesia. It covers all disasters including tsunamis, earth quakes, volcanic eruptions, flooding, drought, storms, landslides and other natural and man-made disasters. The problem with SLR and coastal inundation is not categorised as disaster under this legislation. This emerged from an interview with a government official from the Disaster Risk Reduction Agency in Semarang. The legislation uses a proactive approach to disaster risk reduction (DRR) and recognises that people have a basic right to protection from disaster, particularly groups who are vulnerable to disaster (Djalante, 2012). Even though the legislation does not explicitly make any reference to climate change impacts and adaptation measures, it does specifically address sea level rise. It is important legislation which deals with disaster risk reduction in Indonesia and covers the full disaster cycle of mitigation, emergency response, compensation and rebuilding. In terms of disaster risk reduction, other legislation only provides protection and accommodation

options, such as spatial planning implementation and building coastal dyke or sea wall whereas Law No 24/2007 provides retreat options in DRR. Article 32 states that the government can decide that disaster prone areas are restricted for settlement and/or remove the land title or the ownership of the land and pay compensation to the people that the land title is being removed from.

3.2. Law of the Republic of Indonesia, No 32/2014: the sea

The increasing concern over sea level rise impacts has been recognized in Law No 32/2014 on the Sea. Article 53 (1) (c) Law No 32/2014 states that sea related disasters are caused by global warming such as sea level rise, warming of ocean temperature and El-Nino and La-Nina events in the Pacific Ocean. Despite this recognition, there are no details about the specific measures available in legislation to address climate change impacts. Instead, it refers to the disaster management law (article 55 Law No 32/2014), that states the central government and local government has an obligation to conduct a prevention system and manage sea related disasters as an integral part of the national disaster prevention and management system. The national disaster prevention and management system is under the responsibility of BNPB (National Disaster Management Agency) at the national level and BPBD (Local disaster Management Agency) at the local level and regulated under Disaster Management Law No 24/2007.

3.3. Law of the Republic of Indonesia, No 26/2007: spatial planning

Despite, Law No 26/2007 on Spatial Planning not making any reference to climate change, this is important legislation in regulating land use planning. The recognition of climate change impact is explicitly stated in Government Regulation No 13/2017 on amendment of Government Regulation No 26/2008 on National Spatial Planning. Article 8 (3a) restricts and controls development in disaster prone areas and high risk prone areas to lessen the impact of climate change. Based on this legislation, we can interpret that one adaptation measure in addressing sea level rise is restrictions on developments on low-lying land areas.

3.4. Law of the Republic of Indonesia, No 27/2007: management of coastal areas and small island (as amended with Law No 1/2014)

Law No 27/2007 (as amended with Law No 1/2014) sets out several regulations on adaptation including protection through soft structures and integrated coastal zone management (ICZM). Article 31 has set out the regulations on the beach border protection zone requirement in coastal areas. This measure aims to protect beaches from earthquake and tsunami, erosion or abrasion, storm, flood and other natural disaster and protection of beach ecosystems, such as mangrove, wetland, sea grass, sand dune, estuaries and deltas. Furthermore, Presidential Regulation No 51/2016 on Coastal Zone has mandated that the coastal zone protection should be approximately 100 m from high tide to the shore. This means that there is a restriction on development that is considered to be too close to the beach. However, the implementation of this regulation has been ineffective as many developments have violated the regulation and restrictions have been difficult to implement in some areas as the need for land has increased overtime. In addition, there is a trend of the growth of informal settlements near the coastal areas in urban areas or near the river bank. Industrialisation in the coastal areas is one of the causes of the growth of informal settlement (Sariffuddin et al., 2017).

In addition, Law No 27/2007 makes a reference to ICZM. The IPCC has suggested that ICZM is widely recognized as the most appropriate process to deal with climate change, sea level rise and other coastal challenges (IPCC, 2014). To achieve ICZM, Law No 27/2007 on Coastal Management and Small islands articles 7–14 has mandated local governments to establish coastal and small islands planning and zonation.

However, only 5 of the 34 local governments in Indonesia have finalized and completed the planning and adopted it into local regulations (Amalo, 2015). By 2018, 12 provinces have completed the zonation regulations. Indeed, there are challenges in completing ICZM in Indonesia as there are many conflicting interests between sectors which are difficult to resolve.

3.5. Law of the Republic of Indonesia, No 32/2009: Environment Protection and Management

Concern over climate change impacts has been recognized in Law No 32/2009 on Environmental Management. Article 21 (4) states criteria of environmental damage due to climate change impact is based on increasing of temperature, sea level rise, storm, and drought. Law No 32/2009 is adopting protection of soft structures, such as mangrove forest. Mangrove forest could play an important role in protecting coastal areas from sea level rise. According to a study conducted by University of Southampton, mangroves have the ability to create a buffer zone between the sea and the land (Southampton, 2015). The protection of mangroves have been regulated in several legislation including: Law No 5/1990 on Conservation of Living Resources and their Ecosystem, and Law No 41/1999 on Forestry Law. However, degradation of mangrove forest in some areas has taken place as they are converted into shrimp farming or other developments.

3.6. Law of the Republic of Indonesia, No. 7/2016: protection and empowerment of small scale Fishers, aquaculture farmers and salt farmers

To protect the small scale fishers from climate change impact, the government adopted Law No 7/2016 on the protection and empowerment of small scale fishers, aquaculture farmers and salt farmers. Small scale fishers, small scale aquaculture farmers and salt farmers are highly dependent on fish resources, environmental condition, facilities and infrastructure, business certainty, access to capital, science and technology therefore they need to be protected and empowered. Article 30 Law No 7/2016 mandated the central government and local government to protect small scale fishers, and aquaculture farmers and sea salt farmers by providing insurance. Article 39 has mandated the government to provide safety and security on the sea while fishing in the fisheries management territory of the Republic of Indonesia. Safety that is to be provided by the government includes ensuring the safety equipment of fishermen before fishing and providing search and rescue functions. Shelton notes the potential to provide safety at sea, is to invest in larger vessels, as small vessels are risky in rough conditions (Shelton, 2014).

Each of the different legislative instruments above have been examined to assess the extent to which they cater for sea level rise and climate change. The comparison is seen below.

4. Gap and challenges in adaptation policy implementation

We approached the adaptation policy analysis prepared that there was not a single comprehensive climate change adaptation law for Indonesia, and the analysis confirmed this. Table 1 below, presents the summary of legal and policies options for the Climate Change Adaptation (CCA) framework in addressing SLR in Indonesia indicating the type of adaptation approach taken.

Two main adaptation approaches were observed across the adaptation instruments, namely “hazard based” and “resilience and vulnerability”. Table 1 shows that the hazard based approach is more frequently contained in the various legislations as adaptation options to address sea level rise in Indonesia, rather than a resilience and vulnerability approach.

The hazard based approach includes the establishment of sea walls, dykes, and mangrove forests. The resilience and vulnerability approach seeks to improve resilience and adaptive capacity of the community,

which is not necessarily an outcome promoted under the current legislation.

The adaptation legislation review in Table 1 indicates that Indonesia addresses climate change impacts through adaptation which is embodied in the legislation in several sectors and is formulated under national policy documents. Based on the analysis the legal framework on climate change adaptation, tends to be more focused on structural measures, such as hazard reduction, rather than non-structural measures, such as promoting resilience. For example, in addressing sea level rise the government chooses to have a disaster risk reduction approach focusing on building infrastructure to reduce sea level rise, as opposed to an ecological resilience based approach, such as maintaining coastal mangrove forest. In addressing food security issues the legislation has an ecosystem based approach and seeks to improve community resilience by providing protection from climate change impacts to small scale fishers, aquaculturists and salt farmers. The hazard based approach is dominant in national legislation and has become the main options in sectoral legislation. While Disaster management law No 24/2007 could be the main legislation at the forefront of responding to climate change impacts and sea level rise, it does not explicitly make a reference to climate change.

There is also a significant gap in the current legislation in Indonesia in the area of addressing adaptation due to sea level rise. It has been argued that adaptation is a far more complex legal problem than mitigation (Craig, 2010). In addition, adaptation laws need to cope with multilevel layers of government administrations and interests in Indonesia's many islands and regions. Thus the current sectoral approach in legislation may not be adequate in addressing the impact of sea level rise which requires multi-level layers of government involvement and coordination. The new local government law No 23/2014 has complicated the effort to address the impact of SLR, as districts and municipalities level no longer have the authority to manage coastal areas. Previously, municipal level government could manage the coastal area from 0 to 4 nautical miles from shore. This authority has now been transferred to the provincial level, who manage the coastal area 0–12 nautical mile from shore. So now the effort to address SLR only involves the provincial and national level governments and the district/municipal level only can wait to see the efforts from these two higher levels of government.

In addition, a gap in the current legislation is a lack of a vulnerability and resilience approach in addressing SLR in coastal areas under sectoral legislation. It is important to strengthen the resilience of coastal communities to climate-related hazards by promoting poverty eradication, food security and sustainable livelihoods. In addition, most of the sectoral legislation opts to take protection and accommodation measures, while there is lack of consideration of the retreat option (Farber, 2013). The current legislation did not address how to manage retreat options from rising waters, which has property right impacts and may require compensation for land lost because of sea level rise (Farber, 2013).

Further, in terms of vulnerability the current legislation does not address future events and the uncertainty of climate change impacts, such as population migration due to environmental impacts. For example, people living in small islands have a high risk of experiencing climate change impacts, such as extreme weather events and sea level rise. The existing Law No 27/2007 does not mention specific details on adaptation measures in small islands and includes the worst case scenario of environmental migration. Instead it mandated that the local government is to do disaster mitigation in coastal areas and small islands. Article 56–59 Law No 27/2007 states that Central Government and local government are obliged to apply disaster mitigation steps in the management plans of coastal areas and small islands.

Disaster mitigation responsibility is shared between central government, local government and community. Mitigation of disaster threats should be implemented by taking into consideration the social, economic and cultural aspects of the community, environment

Table 1

Legal and policies options of CCA framework addressing sea level rise in Indonesia.

Legislative Framework	Adaptation options		Institutional
	Hazard based approach	Resilience and vulnerability approach	
Law No 32/2014 on Sea Referred to National disaster prevention and management system Law No 24/2007	X	x	BNPB (National Disaster Management Agency)
Law No 27/2007 on Management of Coastal Areas and Small Island Beach protection Zone Coastal planning and zonation (ICZM)	x	x	Local Government Local Government
Law No 32/2009 on Environmental Management Law No 41/1999 Forestry Law Law No 5/1990 Law on Conservation of Living Resources and Their Ecosystem Protection of mangrove forests	X		The Ministry of Environment and Forestry
Law No 24/2007 on Disaster Management Law Does not explicitly make reference to climate change and SLR, However, it can be considered as provide DRR framework	X	x	BNPB (National Disaster Management Agency) BPBD (Local Disaster Management Agency)
Law No. 7/2016 on Protection and empowerment of small scale fisher, aquaculture farmer and salt farmer		x	The Ministry of Marine Affairs and Fisheries

sustainability, benefit and effectively, scope and the size of the area. Mitigation is implemented through structures, such as sea walls and dyke infrastructure and non-structural measures, such as mangrove forests. The choices of mitigation measure are decided by the government institution who has the legislative authority.

In addition, the analysis revealed there is lack of guidance in the legislation on how to involve the community in decision making, especially on challenges such as climate change adaptation measures. Community participation is guaranteed by Law No 32/2009 on Environment Protection and Management in conducting Environmental Impact Assessment (EIA) process and development process. However, in practice the community is rarely consulted about implementation (Ani, 2017).

One of the central issues which needs to be incorporated into legislation, is a requirement to address the existing vulnerabilities of impacted populations. The reduction of poverty in urban areas, improvements of housing and living conditions, the need for improved infrastructure and services are central issues in adaptation and resilience options (Satterthwaite et al., 2007). However, there are constraints on the implementation of poverty reduction in Indonesia, especially in urban mega cities areas like Jakarta, Semarang and Surabaya. Indonesia faces challenges including a slow reduction of poverty rates, rising inequality in society and the high level of vulnerability of people living in poverty (World Bank, 2014). Social protection is only targeted at specific segments of the population. For example, informal settlements which illegally occupy land are forcibly evicted to make the way for the clearing flood-prone land program, which is quite problematic in its implementation (Huda, 2017).

4.1. Discussion- the need to include climate justice issues at the local level

The analysis of the national adaptation legislation and policy approaches has revealed gaps in both the legislation and the approach to dealing with climate change adaptation and sea level rise. The government legislative processes have to be implemented through several layers of national, provincial and local government. Recent alterations to these governance arrangements has made responses to climate change and sea level rise problems faced by those in the coastal communities problematic. This is has led to the requirement for a more climate justice based approach developing.

Policy options taken at the national and local government levels have sometimes disadvantaged vulnerable communities and groups. For example, the national government chose to establish a Giant Sea

Wall project to address sea level rise in Jakarta. The local government together with National Capital Integrated Coastal Development (NCICD) project, a consortium of Dutch firms, has proposed to build a giant sea wall, in the shape of the Garuda, work having commenced in October 2014 (see Fig. 1). This is biggest project in the region with an estimated cost of around \$40 billion with three phases of works (Phase A-inner sea wall, Phase B - external sea wall and Phase C - port construction and other developments) and will finish in 2050 (Tambun, 2015). In addition to this project, local government will also develop 17 islands through a reclamation project (Mariani, 2016).

These two projects are creating controversy and led to criticism and rejection by small scale fishers, who are concerned their livelihood will be affected by the projects including the fishers in North Jakarta (Angke Bay, Marunda and Cilincing) (Kiara, 2014). Kiara claims that the project has not conducted an Environmental Impact Assessment (EIA). Kiara, a fisheries NGO estimated that 16,855 fishermen will be displaced by these projects (Elyda, 2015). While this ambitious project will probably protect all the citizens of Jakarta from SLR in the long term, displacement of small scale fisherman near Jakarta Bay, appears to be a short term cost and raises serious valuation issues and the social justice of climate change adaptation actions. Below is the map of Giant Sea wall.

Another example is in the Indonesian cities of Semarang and Demak. To address SLR and land subsidence, the Ministry of Public Works will establish an integrated sea wall and toll road from Semarang and Demak, 26 km in length (PUPR, 2018). This sea wall is expected to protect coastal communities from sea level rise impacts and coastal flooding. However, some areas in Demak are excluded from the sea wall, have suffered a lot of damage, and some areas are permanently inundated. If this infrastructure is built, these areas will also be affected by the change in the sea currents and wave action (Bintari, 2018). It is argued that the central government has prioritized coastal protection for Semarang, which is an industrial city, rather than for Demak, which is an agricultural city. Some local communities that have been interviewed, have been sceptical about the government's efforts to address the impact of SLR promptly (Jawat, 2018). Fig. 2 below is the map of sea wall and toll road integration proposal.

The current regulations are also not in favour of social justice. For example, it is stated in the Ministry of Agrarian and Spatial Planning regulations, that land that has been lost due to permanently inundation will revert back to be under government land title. Local communities are objecting about giving their land to the government (Tegar, 2018).

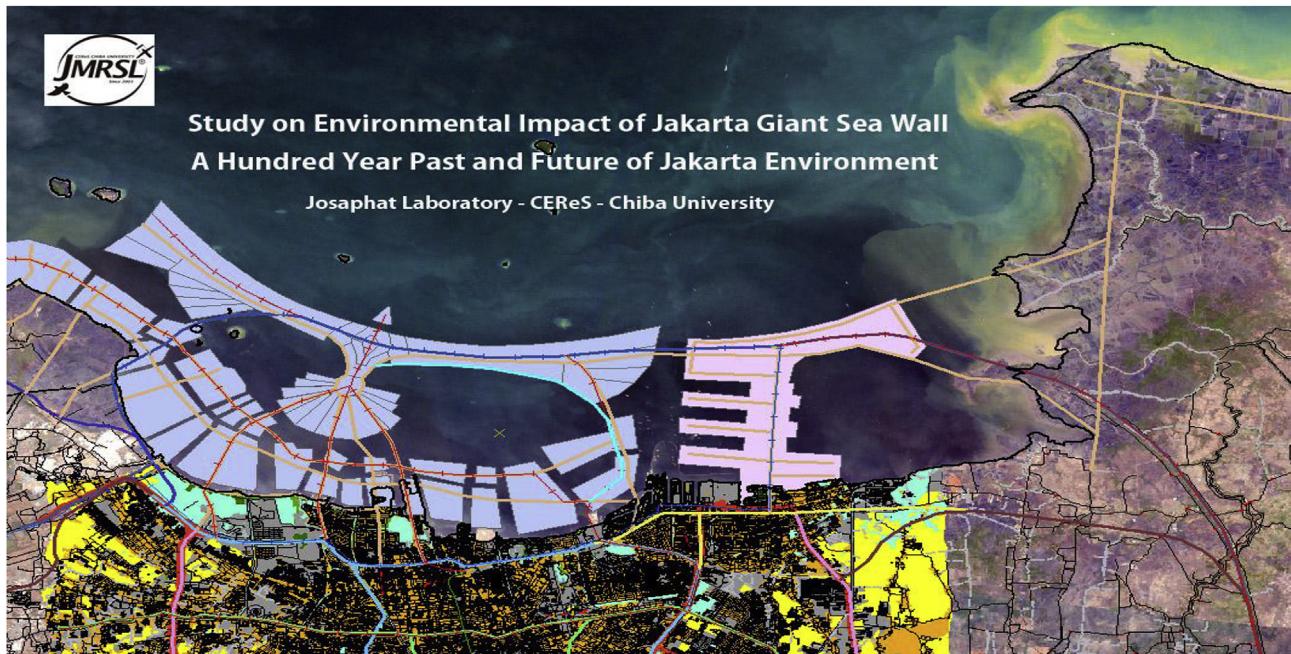


Fig. 1. A map of Northern Jakarta and the sea wall Phase A development currently under construction (Source: Chiba University).

5. Discussion- climate adaptation regime in Indonesia: the way forward?

There is no uniform approach to climate change adaptation globally in coastal areas. The analysis of the current Indonesian legislation has indicated that the current sectoral legislation does not provide adequate protection for groups with existing social, economic or physical vulnerability. Poor communities are less likely to be able to afford to rebuild their infrastructure following extreme climate or SLR events. The policy responses to SLR are to protect, accommodate or retreat. In Indonesia these responses have had significant social justice implications when implemented at a local level. While SLR is a global phenomenon, it has been observed in several cities in Indonesia. To date

the increases of SLR might be modest, but they have been exacerbated by the land subsidence phenomenon. Often land subsidence is as a result of over extraction of ground water resources by industries in coastal areas.

In addition, remote and indigenous people will generally have less access to emergency services during natural disasters (McDonald, 2010). Disaster Management Law No 24/2007 states that the government should provide general protection for the community from threat and the impact of disasters, but surely the government should also provide some level of social protection? In the response implementation process, it seems the individual has to adapt and be resilient on their own due to the government being constrained by lack of financial resources.

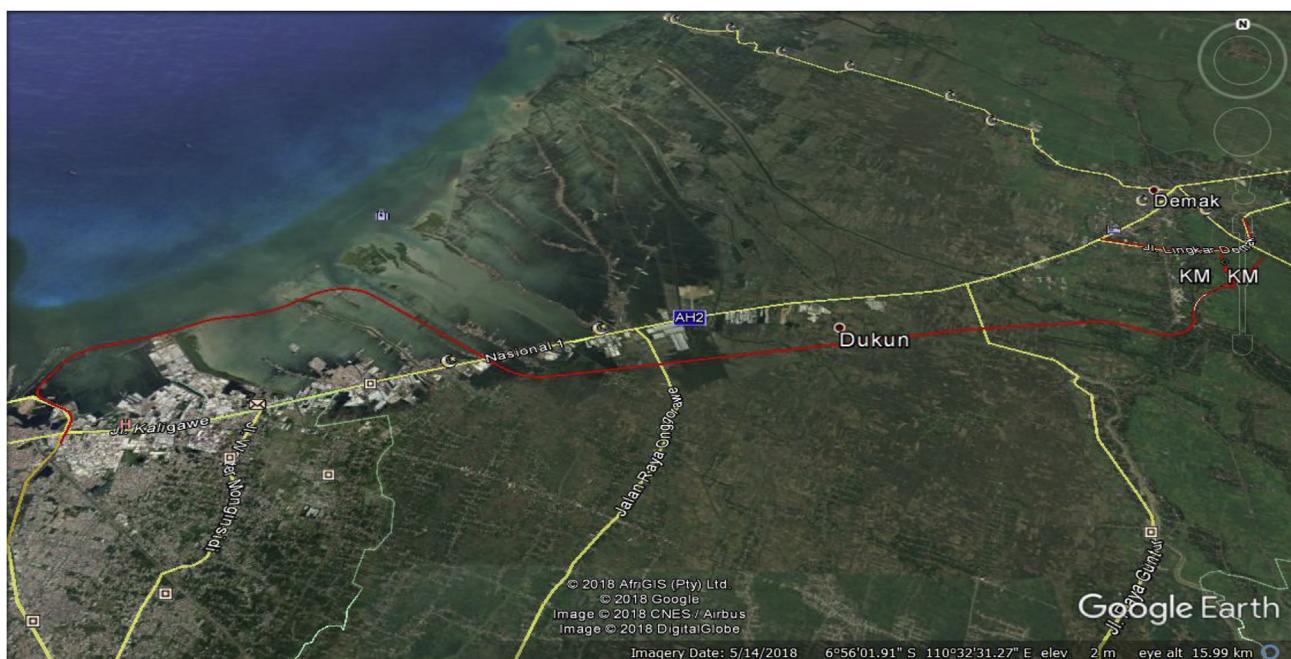


Fig. 2. The proposed sea wall and toll road to be built in the Semarang and Demak areas. (Source: PUPR, 2018).

[Handayani and Kumalasari \(2015\)](#) consider that it is rare to find cases of environmental migration as a result of climate change impacts in Indonesia. They state that permanent migration as an adaptation response, has not been chosen as an option yet in dealing with the environmental hazards in Java ([Handayani and Kumalasari, 2015](#)). However, based on our example of the city of Demak, more than 2000 people could be displaced as a result of their areas being permanently inundated. The problem with this mass human migration, is that there is no clear mandate in the current legislation to respond to this scale of migration. As a result, local communities are just given government land on the bank of river as a temporary relocation. The government needs to address this issue in domestic adaptation laws and policies so as to prepare for the future risk of climate change impact. For example, there should be amendments to national disaster management Law, No 24/2007, to include a reference to climate change and outline possible responses to climate change impacts. While climate change impacts have different effects in a range of places, because of climatic variation, it might be necessary to also establish local climate adaptation laws and policies at the provincial level to suit local needs.

The legislation and adaptation policies needs to provide clarity to assist public and private sector funded adaptation initiatives to develop. The availability of funding mechanisms would also help to offset the disproportionate economic burden on disadvantaged individuals or groups ([McDonald, 2010](#)). Currently the government funding policies to address the distributive impacts arising from the implementation of climate change adaptation measures are not clearly specified. This may because the adaptation costs and community impacts are likely very high and are currently unknown, leading the government to indicate there are no allocated funds, or to fund action on a case by case approach. It is desirable to have clarity so as the private sector can also be involved in adaptation and public private partnerships could be developed. The adaptation costs, funding policies and mechanisms need to be investigated by government and the private sector to help minimise future social discord and community discontent associated with government policies that address climate change and SLR.

Climate change is expected to hit poor countries the hardest ([The Guardian, 2013](#)). Climate change and SLR have been observed and experienced in coastal cities in Indonesia supporting the Guardian's claim. Highly populated and low lying delta areas, such as Jakarta and Semarang, are very vulnerable and under threat from sea level rise ([Sarah and Soebowo, 2018](#)). Climate change has had environmental, social, economic and cultural impacts for local communities in urban coastal areas. Indeed, climate change exacerbates poverty and threatens the food security of people living in coastal areas. It is timely to not just investigate the legal framework for coastal management in Indonesia in a search for climate change adaptation regimes, but for legislation to be renewed if they are not believed to be adequate. For example Indonesia does not currently have any specific and integrated laws on climate change adaptation and this is one part of the way forward. Human right laws will also provide important checks on the design and implementation of adaptation policies ([McDonald, 2010](#)).

The analysis of climate change adaptation and policies for sea level rise in Indonesia indicated that there should be improvement to the existing adaptation laws, particularly for disaster management law, which could incorporate references to climate change and climate change adaptation. It was also found that given the uncertainty of climate change risk, the law should be prepared to cater for worst case scenarios which may eventuate in the future.

6. Conclusion

From the analysis of legislative adaptation legislation, it seems that climate change adaptation has been incorporated into sectoral legislation and formulated under national policy documents. However, most of the sectoral legislation is more focussed on structural "hazard" measures than non-structural measures, such as community resilience

and vulnerability, in addressing the impact of sea level rise. This is a narrow approach to implementing responses, taking limited consideration of the impact and vulnerability of the local community, and hence not always resulting in good decisions for all.

The government legislation and adaptation policies also need to give sufficient clarity for government and private sector funded adaptation initiatives to develop. The potential costs and impacts of climate change and SLR need to be estimated to inform the adaptation process at all levels. Funding for climate change adaptation is required for public and private sector adaptation initiatives to offset the inevitable distributive inequities arising from adaptation policy implementation among the community. Agreed principles of social justice in assessment of proposed adaptation policies would also reduce community impacts.

Improvements to the sectoral laws are needed so as to incorporate adaptation laws. There should be development in other existing laws to include and explicitly address the social justice implications of climate change impacts, through either better public consultation, or new forms of adaptation assessment process.

Finally, the government need to recognize community based adaptation frameworks as an emerging approach, as they present an opportunity for local community level participation in framing adaptation planning and activities, with wider transformative potential for urban governance.

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